
Tissue-engineering of the gastrointestinal tract.

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Public Summary:

The purpose of this review is to describe recent advancements in tissue-engineering of the gastrointestinal system. For some patients, a congenital or acquired defect in the alimentary system results in digestive or nutritional deficiencies requiring intervention. Unfortunately, these treatments are associated with morbid complications. Advances in the growth of tissue-engineered esophagus, stomach, small intestine, colon and anus have been made in recent years. The progress reviewed here hopefully will someday benefit patients with gastrointestinal organ loss by providing a tissue replacement with morphology and function similar to native tissue.

Scientific Abstract:

PURPOSE OF REVIEW: The purpose of this review is to describe recent advancements in tissue-engineering of the gastrointestinal system. For some patients, a congenital or acquired defect in the alimentary system results in digestive or nutritional deficiencies requiring intervention. Unfortunately, these treatments are associated with morbid complications. Advances in the growth of tissue-engineered esophagus, stomach, small intestine, colon and anus have been made in recent years. The progress reviewed here hopefully will someday benefit patients with gastrointestinal organ loss by providing a tissue replacement with morphology and function similar to native tissue. **RECENT FINDINGS:** In native gastrointestinal tissue, epithelial homeostasis is governed largely by the interaction of the stem cell and its surrounding cellular niche. In particular, the small intestinal stem cell populations identified as the crypt base columnar cell (CBCC) and at cell position 4 (cp4) are responsible for mucosal maintenance and response to injury. This work influences efforts to generate bioengineered tissues for both in-vitro mucosal models and full-thickness in-vivo tissue-engineered esophagus, stomach, intestine and colon. **SUMMARY:** Gastrointestinal organ loss is a challenge to manage. Current therapy can be life-saving, but is associated with morbid complications. Tissue-engineering will someday restore normal gastrointestinal function and eliminate the need for nutritional supplementation or transplant.

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